

AMENDMENTS TO THE CLAIMS

Listing of Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

1. (Currently Amended) A process for the synthesis of a bead-shaped, cross-linked, hydrophilic copolymer, comprising:

radically polymerizing a monomer phase, in a bead polymerization process, in the presence of a polymerization initiator and a protective colloid,

the monomer phase comprising:

monomers, and

a diluent,

the monomer phase being present during the polymerization in dispersed form as droplets in a dispersion medium comprising an organic solvent selected from the group consisting of aliphatic hydrocarbons with 5 to 7 carbon atoms;

to thereby obtain said bead-shaped, cross-linked, hydrophilic copolymer, the copolymer having a binding activity toward ligands containing nucleophilic groups,

wherein said monomer phase comprises as monomers

a) 5 to 40 wt% of hydrophilic monomers which contain a vinyl group, said hydrophilic monomers being capable of radical polymerization, and being capable of forming at least 10% aqueous solutions at room temperature,

b) 30 to 50 wt% of monomers which contain a vinyl group and an additional functional group, said monomers being capable of radical polymerization and being capable

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of forming at least one covalent bond in a reaction with at least one nucleophilic group of a ligand, and

c) 20 to 60 wt% of cross-linking monomers which contain two or more ethylenically unsaturated polymerizable groups, said cross-linking monomers being capable of radical polymerization,

wherein a), b) and c) add up to 100 wt%,

wherein said monomer phase comprises as diluent a mixture of methanol and water in the ratio of 1:1.0 to 1:4.0,

wherein a ratio of monomer phase to dispersion medium ranges from 1:2.0 to 1:4.0,

and

wherein a ratio of monomers to diluent ranges from 1:1.7 to 1:2.4.

2. (Previously Presented) The process according to Claim 1, wherein said monomers are

- a) acrylamide, methacrylamide or mixtures thereof,
- b) glycidyl methacrylate, allyl glycidyl ether or mixtures thereof,
- c) methylenebisacrylamide or methylenebismethacrylamide.

3. (Previously Presented) The process according to Claim 1, wherein said organic solvent is cyclohexane.

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4. (Previously Presented) A support polymer material obtained by the process

according to Claim 1, said support polymer having a binding capacity for penicillin amidase from *E. coli* of at least 220 U/g moist, based on a reaction of 1530 units of penicillin amidase with 1 g of said support polymer material, and

said support polymer having a swelling factor of at most 1.5.

¹³
~~5.~~

(Previously Presented) A method of binding proteins, comprising:

contacting the support polymer material according to Claim ~~4~~¹² with at least one protein.

¹⁴
~~6.~~

(Previously Presented) A method of binding enzymes, comprising:

contacting the support polymer material according to Claim ~~4~~¹² with at least one enzyme.

¹⁵
~~7.~~

(Previously Presented) A method of binding antibodies, comprising:

contacting the support polymer material according to Claim ~~4~~¹² with at least one antibody.

¹⁶
~~8.~~

(Previously Presented) A method of chromatography, comprising:

contacting the support polymer material according to Claim ~~4~~¹² with at least one compound.

¹⁷
~~9.~~

(Previously Presented) A method for synthesis of pharmaceuticals, comprising:

synthesizing a pharmaceutical in the presence of the support polymer material
according to claim ~~4~~¹².

~~10~~¹⁸. (Previously Presented) A method for stereospecific synthesis of chiral substances,
comprising:

synthesizing a chiral substance in the presence of the support polymer material
according to claim ~~4~~¹².

~~11~~⁴. (Previously Presented) The process according to Claim 1, wherein said monomer
a) is a methacrylamide.

~~12~~⁵. (Previously Presented) The process according to Claim 1, wherein said functional
group of monomer b) is an oxirane group.

~~13~~⁶. (Previously Presented) The process according to Claim 1, wherein said ligand of
said nucleophilic group is an oxirane group.

~~14~~⁷. (Previously Presented) The process according to Claim 1, wherein said monomer
c) is N, N'-methylenebismethacrylamide.

~~15~~⁸. (Currently Amended) The process according to Claim 1, wherein said ratio of
monomers to diluent is from 1:1.9 to 1:2.1.

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~~16~~. (Previously Presented) The process according to Claim 1, wherein said ratio of monomer phase to dispersion medium is from 1:2.8 to 1:3.3.

¹⁰
~~17~~. (Previously Presented) The process according to Claim 1, wherein said protective colloid is a copolymer comprising 95 parts of n-butyl methacrylate and 5 parts of 2-trimethylammoniumethyl methacrylate chloride having a weight average molecular weight of from 30,000 to 80,000.

¹¹
~~18~~. (Previously Presented) The process according to Claim 1, wherein said copolymer has a size of from 50 to 500 μ m.

¹²
19. (Currently Amended) A method of covalently binding of a ligand, comprising:
contacting the support polymer material according to Claim ~~4~~ with a ligand to
covalently bind the ligand to the support polymer material;
wherein said support polymer material has an oxirane group.

20. (Currently Amended) A support polymer beads material loaded with a ligand and obtained by the method according to Claim 19.

21. (Canceled)